Having described the invention, we claim:

1. An apparatus for automatically retroperfusing a coronary vein with oxygenated blood from an artery, said apparatus comprising:

an intraluminal cannula having a main body portion extending between a proximal end portion and a distal end portion;

said proximal end portion for connecting to an artery outside of the pericardium to automatically supply oxygenated blood from the artery for retroperfusion of the coronary vein;

said main body portion and said distal end portion being insertable through a vein that is fluidly connected with the coronary vein to be retroperfused and into the coronary vein;

an expandable stent attached to said distal end portion of said cannula for expanding radially into engagement with the interior wall of the coronary vein to secure the distal end portion at a location within the coronary vein; and

occluding means for at least partially occluding the coronary vein to decrease the back-flow of blood into the right atrium during retroperfusion, said occluding means being located at said distal end portion of said cannula.

2. The apparatus of claim 1 wherein said occluding means is disposed within said stent.

3. The apparatus of claim 1 wherein said occluding means comprises an umbrella-shaped membrane defined by an open end and a closed end, said closed end being attached to an outer surface of said distal end portion of said cannula, said open end being attached to said stent so that, when said stent is expanded, said membrane spans a radial distance between the interior wall of the coronary vein and said outer surface of said distal end portion of said cannula.

4. The apparatus of claim 3 wherein said membrane includes at least one opening to allow limited blood flow across said membrane.

5. The apparatus of claim 1 wherein said occluding means comprises an inflatable balloon, said balloon having a plurality of lobes disposed circumferentially about said distal end portion of said cannula, said plurality of lobes defining a plurality of radial gaps between said lobes through which a limited quantity of blood may flow.

6. The apparatus of claim 1 wherein said proximal end portion of said cannula comprises a graft for suturing to the artery outside of the pericardium to automatically supply oxygenated blood for retroperfusion of the coronary vein.

7. The apparatus of claim 6 wherein said graft is positioned subcutaneously following suturing to the artery.

8. The apparatus of claim 1 further comprising a catheter for inserting into the artery to access the oxygenated blood and a connecting tube that is attached between said catheter and said proximal end portion of said cannula.

9. The apparatus of claim 8 wherein said catheter and said proximal end portion of said cannula extend percutaneously and said connecting tube lies above the skin.

10. The apparatus of claim 1 wherein said intraluminal cannula includes a plurality of lumens.

11. The apparatus of claim 10 wherein said distal end portion of said cannula includes a plurality of openings, each of said plurality of openings being fluidly connected with a respective one of said plurality of lumens in said cannula.

12. The apparatus of claim 1 further including a removable sheath for enclosing said intraluminal cannula during insertion of said distal end portion into the coronary vein.

13. An apparatus for automatically retroperfusing a coronary vein with oxygenated blood from an artery, said apparatus comprising:

an intraluminal cannula having a main body portion extending between a proximal end portion and a distal end portion, said proximal end portion for connecting to an artery to automatically supply oxygenated blood from the artery for retroperfusion of the coronary vein;

said main body portion and said distal end portion being insertable through a vein that is fluidly connected with the coronary vein to be retroperfused and into the coronary vein;

an expandable stent attached to said distal end portion of said cannula for expanding radially into engagement with the interior wall of the coronary vein to secure the distal end portion at a location within the coronary vein; and

occluding means for at least partially occluding the coronary vein to decrease the back-flow of blood into the right atrium during retroperfusion, said occluding means being disposed within said stent.

14. The apparatus of claim 13 wherein said occluding means comprises an umbrella-shaped membrane defined by an open end and a closed end, said closed end being attached to an outer surface of said distal end portion of said cannula, said open end being attached to said stent so that, when said stent is expanded, said membrane spans a radial distance between the interior wall of the coronary vein and said outer surface of said distal end portion of said cannula.

15. The apparatus of claim 14 wherein said membrane includes at least one opening to allow limited blood flow across said membrane.

16. The apparatus of claim 13 wherein said occluding means comprises an inflatable balloon, said balloon having a plurality of lobes disposed circumferentially about said distal end portion of said cannula, said plurality of lobes defining a plurality of radial gaps between said lobes through which a limited quantity of blood may flow.

17. The apparatus of claim 13 wherein said proximal end portion of said cannula comprises a graft for suturing to the artery outside of the pericardium to automatically supply oxygenated blood for retroperfusion of the coronary vein.

18. The apparatus of claim 1 further comprising a catheter for inserting into the artery to access the oxygenated blood and a connecting tube that is attached between said catheter and said proximal end portion of said cannula.

19. The apparatus of claim 13 wherein said intraluminal cannula includes a plurality of lumens.

20. The apparatus of claim 19 wherein said distal end portion of said cannula includes a plurality of openings, each of said plurality of openings being fluidly connected with a respective one of said plurality of lumens in said cannula.

21. The apparatus of claim 1 further including a removable sheath for enclosing said intraluminal cannula during insertion of said distal end portion into the coronary vein.

22. A method for automatically retroperfusing a coronary vein with oxygenated blood from an artery, said method comprising the steps of:

providing an intraluminal cannula having a main body portion extending between a proximal end portion and a distal end portion, the distal end portion including an expandable stent and occluding means for at least partially occluding the coronary vein;

inserting the main body portion and the distal end portion of the cannula through a vein that is fluidly connected with the coronary vein to be retroperfused and into the coronary vein;

radially expanding the stent into engagement with the interior wall of the coronary vein to secure the distal end portion at a location within the coronary vein, wherein the radial expansion of the stent causes the occluding means to span the coronary vein; and

fluidly connecting the proximal end portion of the cannula to an artery to automatically supply oxygenated blood for retroperfusion, wherein the occluding means at least partially occludes the coronary vein to decrease the back-flow of blood into the right atrium during retroperfusion.

23. The method of claim 22 wherein said step of fluidly connecting the proximal end portion to an artery comprises suturing a graft located at the proximal end portion to the artery outside of the pericardium.

24. The method of claim 23 further comprising the step of positioning the graft subcutaneously following suturing to the artery.

25. The method of claim 22 wherein said step of fluidly connecting the proximal end portion to an artery comprises the steps of:

inserting a catheter into the artery to access the oxygenated blood; and

attaching a connecting tube between the catheter and said proximal end portion of the cannula.

26. The method of claim 25 further comprising the step of extending the catheter and the proximal end portion of said cannula in a percutaneous manner and positioning the connecting tube above the skin.